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FACT SHEET
CANONSBURG URANIUM MILL TAILINGS SITE

ORIGINAL (Red)

INTRODUCTION

The inactive uranium processing site in Canonsburg, Pennsylvania has been designated for remedial action under the provisions of the Uranium Mill Tailings Radiation Control Act of 1978. It is one of 25 designated sites located in nine western states and Pennsylvania. The purpose of the remedial action is to minimize or eliminate potential health hazards resulting from exposure of the public to residual radioactive materials on the processing sites and on contaminated vicinity properties.

The Uranium Mill Tailings Remedial Actions (UMTRA) Project is administered by the U.S. Department of Energy (DOE) in cooperation with the affected states and Indian tribes. The U.S. Environmental Protection Agency (EPA) is promulgating cleanup and disposal standards. The DOE's UMTRA Project Office in Albuquerque, New Mexico, will carry out the remedial actions. The U.S. Nuclear Regulatory Commission (NRC) will consult with the DOE on the remedial actions and will license the maintenance and monitoring of the final disposal sites.

SITE SIZE AND LOCATION

The 19-acre Canonsburg site, containing more than 200,000 tons of contaminated material, lies between Chartiers Creek and the ConRail tracks in the Borough of Canonsburg and is currently called the Canonsburg Industrial Park. A major contaminated vicinity property is the 9-acre Burrell Township site, to which 12,000 tons of contaminated material were shipped from Canonsburg between October 1956 and January 1957. The Burrell Township site is about a mile east of Blairsville, Pennsylvania, between the Conemaugh River and the ConRail tracks.

HISTORY OF SITE

The Canonsburg site was originally operated as a radium extraction plant by The Standard Chemical Company from 1911 to 1922. Later, the Vitro Corporation of America acquired the property and processed the on-site tailings to extract radium and uranium salts. From 1942 until 1957, Vitro was under contract to the Federal government to recover uranium from ore and scrap. For the next nine years, the site was used only for storage under an Atomic Energy Commission contract. Since 1967, the property has been owned by the Canon Development Company and called the Canonsburg Industrial Park. The various buildings on the site are leased to tenant companies for light industry.

PROPOSED REMEDIAL ACTIONS

Two alternative remedial actions will be considered.

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1. To consolidate the contaminated materials from the vicinity properties with the existing material at the Canonsburg site, where all the materials would be stabilized in place and covered.

2. To decontaminate the Canonsburg site and the vicinity properties and to move all the contaminated material to a new permanent disposal site nominated by the Commonwealth of Pennsylvania.

The proposed course of action at this time is the latter alternative.

DISPOSAL SITE SELECTION

In nominating the most suitable candidate sites, state authorities have considered technical factors such as geologic and hydrologic characteristics and non-technical factors such as distance from the processing site that may substantially affect the cost and feasibility of remedial action. Public participation in the site-selection process is encouraged, and a citizens' task force has been formed.

ENVIRONMENTAL IMPACT STATEMENT

The Canonsburg site receives high priority in the UMTRA Project because it is in a highly populated area (8,000 persons within a 1-mile radius) and because some areas of the site are vulnerable to flooding by Chartiers Creek. As a major Federal project, remedial action at the Canonsburg site must satisfy the requirements of the National Environmental Policy Act (NEPA), which include the publication of an environmental impact statement (EIS). The EIS will consider the impacts and benefits of the proposed action and the alternative actions, including potential disposal sites.

After public information meetings have been held and field studies have been carried out, the DOE will prepare a draft EIS. The draft will be reviewed at public meetings and will be revised to incorporate substantive comments. The DOE will use the final EIS to select a specific course of action.

ESTIMATED COSTS

Stabilization in place would cost about 20 million dollars and disposal at a new site would cost about 26 million dollars. Both of these estimates are in 1981 dollars and include the costs of the cleanup of contaminated vicinity properties.

FURTHER INFORMATION

Further information may be obtained from:

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ORIGINAL (Red)

FACT SHEET
URANIUM MILL TAILINGS

WHAT ARE MILL TAILINGS AND WHY ARE THEY A PROBLEM?

Much of the uranium ore mined in the United States from the early 1940s through the 1960s was processed by private companies for the Federal government. Most of the uranium they produced was used in nuclear weapons for national defense programs. After the 1950s uranium was also needed for commercial nuclear power plants, which use uranium as fuel for producing electricity.

Unlike coal and petroleum, uranium is not found in nature in large, relatively pure deposits. Uranium ore contains considerable amounts of other materials such as silica, calcium, phosphorous, thorium, radium, and vanadium. Before the uranium in the ore can be used, it must be separated from these materials, concentrated, and processed.

After the ore has been mined, it is taken to a mill where it is crushed, ground, and chemically treated. The product is a semirefined concentrate called "yellowcake." The yellowcake is then transported to uranium-enrichment plants operated by the U. S. Department of Energy (DOE); there it undergoes further processing.

AMBROSIA LAKE SITE, NEW MEXICO

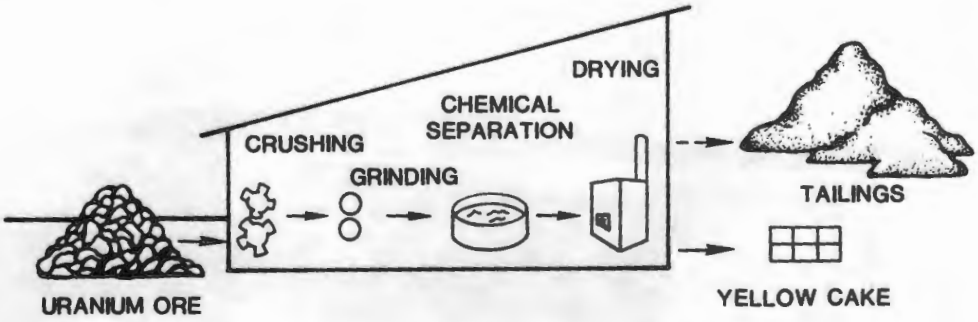
June 1981

TEST DRILLING AT THE SALT LAKE CITY SITE, UTAH

Vast amounts of residues, or tailings, are produced during the milling operation. The tailings, composed mostly of sand-like granules, are usually heaped into piles near the mills after water added during processing has been removed.

WHY A REMEDIAL ACTION PROGRAM?

In 1978, after a determination that uranium mill tailings may pose a radiation health hazard to the public, Congress passed a law directing that every reasonable effort be made to provide for the stabilization, disposal, and control of the tailings in a safe and environmentally sound manner. The DOE was given the responsibility for carrying out the program.



THE MILLING PROCESS

FOR EVERY 1,000 POUNDS OF URANIUM ORE THAT IS MINED, ABOUT 1.5 POUNDS OF URANIUM OXIDE OR YELLOWCAKE AND 998.5 POUNDS OF TAILINGS ARE PRODUCED.

The tailings present a potential health hazard principally because they emit small amounts of radon; they also contain other radioactive and nonradioactive contaminants. Radon is a colorless, inert, radioactive gas formed by the radioactive decay of radium, an element found with uranium in ore. Radon, which has a half-life of four days, decays in turn to form nongaseous daughter products that are also radioactive but far less mobile than radon.

In the natural environment, radon and its daughter products are the sources of some of the background radiation to which the public is exposed. Radon is released naturally from all rocks and minerals that contain radium, but is released more readily from tailings because they have been finely crushed.

Levels of human exposure to radon and other radioactive substances in the tailings piles are quite low. Nevertheless, there is concern that even low levels of radiation may pose unacceptable health hazards to persons who might be exposed over long periods of time, particularly in enclosed areas, or to animals that might eat vegetation growing in tailings.

Although no injuries or deaths due to such small amounts of radiation have been documented, the DOE feels it is prudent to reduce further exposures of the public by stabilizing or disposing of the tailings in a safe and environmentally sound manner. At active mills, the operators are now required to dispose of tailings acceptably.

The problem is that uranium mill tailings have not always been disposed of as carefully as they are now. Because the amount of radiation released from a tailings pile is only a small fraction of the radiation that occurs naturally, experts long thought that no special precautions need be taken at tailings piles. As a result over 25 million tons of tailings were left exposed to the environment at abandoned mill sites.

The inactive tailings piles first received attention in the early 1970s. In Grand Junction, Colorado, tailings had been used for fill material and in some construction materials in about 3,000 buildings. Their occupants were exposed to low-level radiation and elevated radon concentrations. The Federal government became involved and subsequently sponsored a broad examination of the tailings disposal problem.

WHAT REMEDIAL ACTION PROGRAMS ARE UNDERWAY?

In 1972, Congress authorized funding to assist the State of Colorado to conduct a remedial action program in Grand Junction.

: replacement of foundations and the removal of contaminated :erial from the most severely affected homes, schools, and other ildings were completed by 1980. Some buildings still have low vels of contamination, and work on them is expected to be mpleted by 1987.

Under the Act, the DOE is to (1) identify specific sites equiring remedial action, (2) assess potential health hazards, (3) et priorities for remedial actions, (4) enter into cooperative greements with affected states and Indian tribes, (5) prepare nvironmental impact statements, and (6) plan and actually carry out he remedial-action programs.

The Environmental Protection Agency (EPA) advises the DOE on the otential health hazards of the tailings, establishes environmental standards, and reviews environmental impact statements.

The Nuclear Regulatory Commission assists the DOE in the planning of remedial actions and the preparation of environmental documents and licenses final disposal sites.

Since the Uranium Mill Tailings Remedial Action Program began in November, 1978, the DOE has

- Identified and designated 25 inactive processing sites requiring remedial action.
- Begun the process of identifying contaminated properties in the vicinities of the designated sites.
- Established priorities for cleaning up the sites and contaminated properties in their vicinities.
- Organized the Uranium Mill Tailings Remedial Actions (UMTRA) Project Office in Albuquerque, New Mexico, to carry out the project.
- Developed plans for conducting the remedial actions.
- Entered into cooperative agreements with Pennsylvania and Utah and begun negotiations with other affected states and Indian tribes.
- Started a technology development program to study methods of tailings disposal.
- Begun preparation of environmental impact documents.

INACTIVE URANIUM MILL TAILINGS SITE

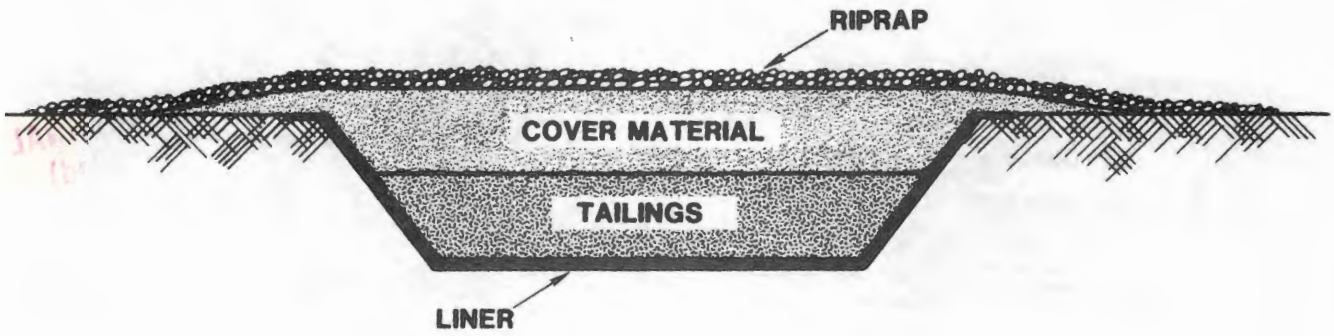
Of the 25 sites requiring remedial action, one is in Pennsylvania, and the others are in the West. The smallest sites cover an area of about 20 acres, while the largest exceed 250 acres--almost the area of 200 football fields.

Some of the tailings piles may be moved to new disposal sites. Most will probably be stabilized in place. As a result of these remedial actions, the piles will be protected from erosion by wind and water; they will not release significant amounts of radioactive material. Where reprocessing is economically feasible, residual uranium or other minerals may be extracted before the piles are stabilized.

Trucks or rail cars will probably be used to move the piles. The tailings will be covered while being transported to prevent them from being blown about and scattered. Federal, state, and local standards will be strictly enforced to protect the health of the workers and the public.

Work at the highest-priority sites is planned to start in 1983, and the cleanup of all sites is expected to be completed by late 1988.

The tailings can be disposed of in several ways. One proposed method of disposal requires a large pit to be dug and lined with clay or other impervious material. The lining would act as a barrier to ground water that might seep into and out of the pit. In addition, the disposal pits would be located in geologically suitable areas where the likelihood of ground-water intrusion is small.



TYPICAL BELOW-GRADE TAILINGS DISPOSAL CONCEPT

While the piles will probably be moved in dry form, an alternative would be to mix the tailings with water to form a slurry that would be piped to disposal sites. There the slurry would be pumped into the pits, where the tailings would settle to the bottom. The water would then be drawn off and possibly used again in the slurry.

When a pit has been filled, it will be covered with soil. Large pieces of stone and rock, called riprap, may then be added to control wind and water erosion. Vegetative cover may be preferred at some disposal sites.

These methods of disposal will ensure that the tailings are effectively isolated from the environment.

SOME FACTS ABOUT RADIATION AND ITS EFFECTS

Radioactive elements such as those found in tailings emit radiation in the form of rays or particles. We are constantly exposed to natural radiation not only from elements in the earth's crust and in our food and water, but also from the sun and outer space.

Levels of natural (or "background") radiation vary from place to place over the earth's surface, but on the average these sources expose each person in the U.S. to about 90 millirem per year. A millirem is a measure of the biological effect of a radiation dose.

We are also exposed to sources of radiation that we ourselves create. X-rays and other kinds of radiation used in medicine and dentistry are among the largest man-made contributions to the radiation we receive. Other sources include structures built of brick and stone, the burning of gas and coal, mining, quarrying, consumer products such as color televisions, and the fallout from atmospheric testing of nuclear explosives.

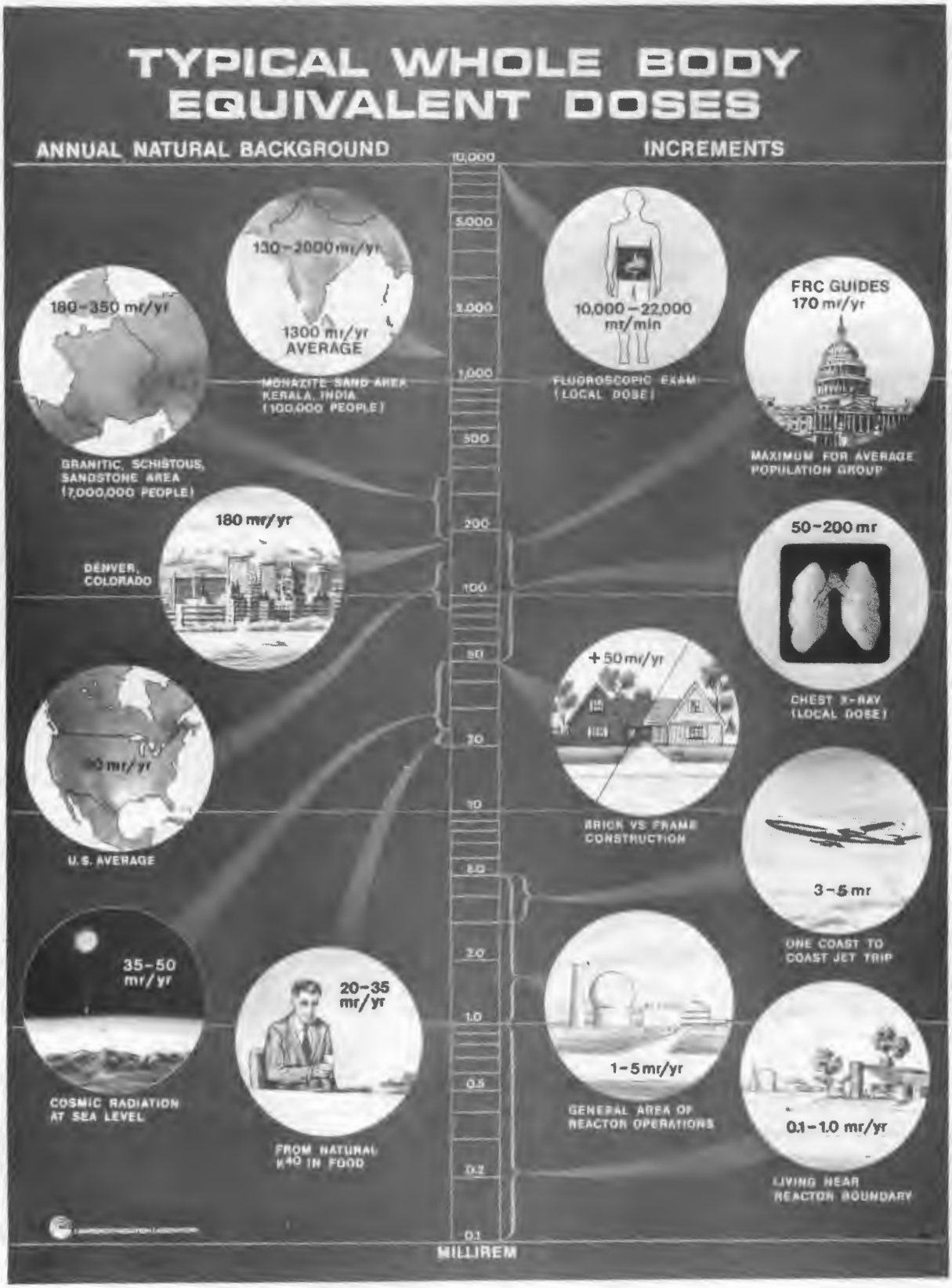
Collectively, these other sources account for only a small part of the annual average radiation dose in the U.S. However, a person who resides in a structure built of brick or stone, for example, may receive more than the average.

A typical inhabitant of the United States is exposed to well over 100 millirem per year from natural and man-made sources. The doses from nuclear power generation, which include the radiation emitted by uranium mill tailings, make up less than 1 millirem of this total.

Although the average level of exposure to radiation from uranium mill tailings is quite low, persons who live near or work around tailings may be exposed to higher levels. Most of the radioactive and nonradioactive contaminants in tailings tend to remain in the piles; only close contact will result in significant exposures from these contaminants. Radon gas, on the other hand, disperses into the atmosphere. Concentrations of radon within 100 yards of an unstabilized tailings pile are many times greater than background concentrations. The radon level decreases rapidly with distance, however, and returns to background within about 1 mile of most piles. Unstabilized tailings may also be scattered by wind and water action and by human activity (as happened in Grand Junction). Wherever this has happened, persons who live or work in contaminated areas may be exposed to elevated levels of radon. The Surgeon General of the United States and the U. S. Environmental Protection Agency have proposed standards to reduce to very low levels the exposure of these people. Remedial actions undertaken as part of the UMTRA Program will meet these new standards.

The effects of radiation on human health have been studied for over five decades. Today more is known about the health effects of radiation than is known about the effects of most other toxic agents in the work place and the environment.

Large doses of radiation are clearly hazardous. Exposure to high levels (4000-6000 times the annual background dose) over a short period of time is usually fatal. A person exposed to lower doses might eventually develop cancer; the likelihood of developing cancer decreases as the dose decreases. Because radon and its daughter products may be inhaled, lung cancer is the principal potential health effect associated with radon exposure.


TYPICAL WHOLE BODY EQUIVALENT DOSES
ANNUAL NATURAL BACKGROUND
INCREMENTS
10,000
5,000
3,000
1,000
500
200
100
50
20
10
5.0
2.0
1.0
0.5
0.2
0.1
MILLIREM
130–3000 mr/yr
1300 mr/yr AVERAGE
MONAZITE SAND AREA KERALA, INDIA (100,000 PEOPLE)
180–350 mr/yr
GRANITIC, SCHISTOUS, SANDSTONE AREA (7,000,000 PEOPLE)
180 mr/yr
DENVER, COLORADO
U.S. AVERAGE
35–50 mr/yr
COSMIC RADIATION AT SEA LEVEL
20–35 mr/yr
FROM NATURAL K40 IN FOOD
10,000–22,000 mr/min
FLUOROSCOPIC EXAM (LOCAL DOSE)
FRC GUIDES 170 mr/yr
MAXIMUM FOR AVERAGE POPULATION GROUP
50–200 mr
CHEST X-RAY (LOCAL DOSE)
+50 mr/yr
BRICK VS FRAME CONSTRUCTION
3–5 mr
ONE COAST TO COAST JET TRIP
1–5 mr/yr
GENERAL AREA OF REACTOR OPERATIONS
0.1–1.0 mr/yr
LIVING NEAR REACTOR BOUNDARY

The very low doses that we receive daily from our environment have not been shown directly to have any effects on health. Studies of the effects of high doses have been used to estimate the effects of much lower doses, but the issue of whether low doses have significant effects is highly controversial. As long as questions remain, it is wise to take steps to minimize the exposure of the public wherever possible. Following the lead set by the proposed EPA regulations, the UMTRA Program will follow this prudent policy.

SOURCES OF ADDITIONAL INFORMATION

Further information on the subjects discussed in this pamphlet can be obtained by writing to

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